

M is a metal atom of group IIIb, IVb, Vb or VIb of the Periodic Table of the Elements,

X is a heteroatom or a hydrocarbon group having 1-40 carbon atoms,

X' is a hydrocarbon group having 1-40 carbon atoms.

23. The transition metal compound as claimed in claim 22, wherein the radicals L are identical or different and are each a substituted cyclopentadienyl group.

24. The transition metal compound as claimed in claim 22, wherein the radicals L are linked to one another via a bridge.

25. The transition metal compound as claimed in claim 22, wherein n is 2 when M is a metal atom of group IVb of the Periodic Table of the Elements.

26. The transition metal compound as claimed in claim 22, wherein

M is a metal atom of group IVb of the Periodic Table of the Elements, n is equal to 2,

L are identical or different and are each a substituted cyclopentadienyl group, where two radicals L are optionally linked to one another via a bridge Z and

Z is  $\text{CR}^2\text{R}^3$  or  $\text{SiR}^2\text{R}^3$  or a unit  $\text{Si}-(\text{CR}^2\text{R}^3)_x-\text{Si}$  which links two fragments  $\text{L}_n\text{MXX}'\text{A-R}_m^1$  with one another, where x is an integer from 0 to 10,

X and X' together form a three-membered to five-membered hydrocarbon chain which can be saturated or unsaturated and are unsubstituted or substituted by one or more C<sub>1</sub>-C<sub>20</sub>-hydrocarbon radicals,

R<sup>2</sup> and R<sup>3</sup> are identical or different and are each a hydrogen atom, a halogen atom, a C<sub>1</sub>-C<sub>20</sub>-alkyl group, a C<sub>1</sub>-C<sub>10</sub>-fluoralkyl group, a C<sub>1</sub>-C<sub>10</sub>-alkoxy group, a C<sub>6</sub>-C<sub>14</sub>-aryl group, a C<sub>6</sub>-C<sub>10</sub>-fluoroaryl group, a C<sub>6</sub>-C<sub>10</sub>-aryloxy group, a C<sub>2</sub>-C<sub>10</sub>-alkenyl group, a C<sub>7</sub>-C<sub>40</sub>-arylalkyl group, a C<sub>7</sub>-C<sub>40</sub>-alkylaryl group, a C<sub>8</sub>-C<sub>40</sub>-arylalkenyl group, or R<sup>2</sup> and R<sup>3</sup> together with the atoms connected them form one or more rings, and R<sup>2</sup> and R<sup>3</sup> are optionally bonded to L.

27. The transition metal compound as claimed in claim 22, wherein

M is zirconium,

n is equal to 2,

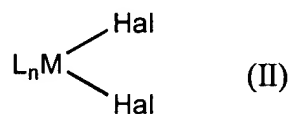
L are identical or different and are each a substituted cyclopentadienyl group, where two radicals L are linked to one another via a bridge Z, where Z is CR<sup>2</sup>R<sup>3</sup> or SiR<sup>2</sup>R<sup>3</sup> and

R<sup>2</sup> and R<sup>3</sup> are identical or different and are each a hydrogen atom, a halogen atom, a C<sub>1</sub>-C<sub>20</sub>-alkyl group, a C<sub>1</sub>-C<sub>10</sub>-fluoralkyl group, a C<sub>1</sub>-C<sub>10</sub>-alkoxy group, a C<sub>6</sub>-C<sub>14</sub>-aryl group, a C<sub>6</sub>-C<sub>10</sub>-fluoroaryl group, a C<sub>6</sub>-C<sub>10</sub>-aryloxy group, a C<sub>2</sub>-C<sub>10</sub>-alkenyl group, a C<sub>7</sub>-C<sub>40</sub>-arylalkyl group, a C<sub>7</sub>-C<sub>40</sub>-alkylaryl group, a C<sub>8</sub>-C<sub>40</sub>-arylalkenyl group, or R<sup>2</sup> and R<sup>3</sup> together with the atoms connected them form one or more rings, and R<sup>2</sup> and R<sup>3</sup> are optionally bonded to L,

X and X' together form an unsaturated four-membered hydrocarbon chain whose hydrogen atoms are optionally replaced by C<sub>1</sub>-C<sub>20</sub>-alkyl groups.

28. A process for preparing the compound as claimed in claim 22,

which comprises reacting a compound of the formula II

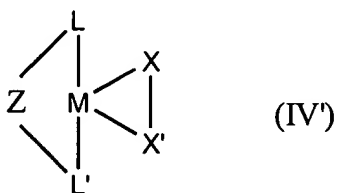


with a compound of the formula III



and reacting the reaction product with a compound of the formula AR<sub>m</sub><sup>1</sup>, where L, n, M, X and X' in the formulae II and III are defined for the formula IV and Hal is a halogen atom.

29. A transition metal compound of the formula IV'



where

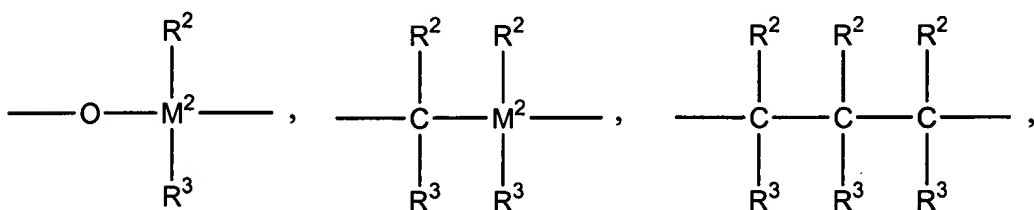
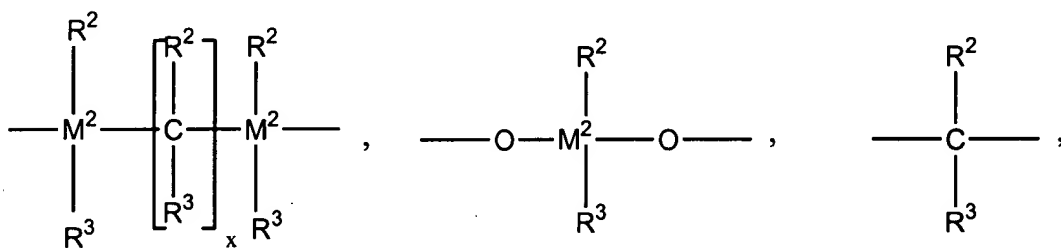
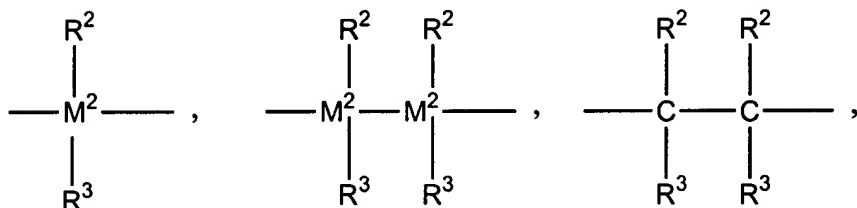
L and L' are identical or different and are each a  $\pi$  ligand or an electron donor,

M is a metal atom of group IIIb, IVb, Vb or VIb of the Periodic Table of the Elements,

X is a heteroatom or a hydrocarbon group having 1-40 carbon atoms,

X' is a hydrocarbon group having 1-40 carbon atoms,

Z is



=BR<sub>2</sub>, -AlR<sup>2</sup>, -Ge-, -O-, -S-, =SO, =SO<sub>2</sub>, -NR<sub>2</sub>, =CO, =PR<sup>2</sup> or =P(O)R<sup>2</sup>, where R<sup>2</sup> and R<sup>3</sup> are identical or different and are each a hydrogen atom, a halogen atom, a C<sub>1</sub>-C<sub>20</sub>-alkyl group, a C<sub>1</sub>-C<sub>1</sub>-fluoroalkyl group, a C<sub>1</sub>-C<sub>10</sub>-alkoxy group, a C<sub>6</sub>-C<sub>14</sub>-aryl group, a C<sub>6</sub>-C<sub>10</sub>-fluoroaryl group, a C<sub>6</sub>-C<sub>10</sub>-aryloxy group, a C<sub>2</sub>-C<sub>10</sub>-alkenyl group, a C<sub>7</sub>-C<sub>40</sub>-arylalkyl group, a C<sub>7</sub>-C<sub>40</sub>-alkylaryl group, a C<sub>8</sub>-C<sub>40</sub>-arylalkenyl group and x is a number from zero to 18, or R<sup>2</sup> and R<sup>3</sup> together with the atoms-connecting them form one or more rings and R<sup>2</sup> or/and R<sup>3</sup> can be bonded to L and M<sup>2</sup> is silicon, germanium or tin.

30. The transition metal compound as claimed in claim 29, wherein the radicals L are identical or different and are each an unsubstituted or substituted cyclopentadienyl group.

31. The transition metal compound as claimed in claim 29, wherein the radicals L are linked to one another via a bridge.

32. The transition metal compound as claimed in claim 29, wherein n is 2 when M is a metal atom of group IVb of the Periodic Table of the Elements.

33. The transition metal compound as claimed in claim 29, wherein

M is a metal atom of group IVb of the Periodic Table of the Elements, n is equal to 2,

L are identical or different and are each a substituted or unsubstituted cyclopentadienyl group, where two radicals L are optionally linked to one another via a bridge Z and

Z is  $\text{CR}^2\text{R}^3$  or  $\text{SiR}^2\text{R}^3$  or a unit  $\text{Si}-(\text{CR}^2\text{R}^3)_x-\text{Si}$  which links two fragments  $\text{L}_n\text{M}'\text{XX}'\text{A}-\text{R}^1_m$  with one another, where x is an integer from 0 to 10.

X and X' together form a three-membered to five-membered hydrocarbon chain which can be saturated or unsaturated and are unsubstituted or substituted by one or more  $\text{C}_1-\text{C}_{20}$ -hydrocarbon radicals.

$\text{R}^2$  and  $\text{R}^3$  are identical or different and are each a hydrogen atom, a halogen atom, a  $\text{C}_1-\text{C}_{20}$ -alkyl group, a  $\text{C}_1-\text{C}_{10}$ -fluoralkyl group, a  $\text{C}_1-\text{C}_{10}$ -alkoxy group, a  $\text{C}_6-\text{C}_{14}$ -aryl group, a  $\text{C}_6-\text{C}_{10}$ -fluoroaryl group, a  $\text{C}_6-\text{C}_{10}$ -aryloxy group, a  $\text{C}_2-\text{C}_{10}$ -alkenyl group, a  $\text{C}_7-\text{C}_{40}$ -arylalkyl group, a  $\text{C}_7-\text{C}_{40}$ -alkylaryl group, a  $\text{C}_8-\text{C}_{40}$ -arylalkenyl group, or  $\text{R}^2$  and  $\text{R}^3$  together with the atoms connected them form one or more rings, and  $\text{R}^2$  and  $\text{R}^3$  are optionally bonded to L.

34. The transition metal compound as claimed in claim 29, wherein

M is zirconium,

n is 2,

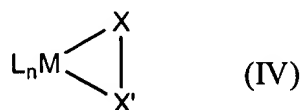
L are identical or different and are each a substituted cyclopentadienyl group, where two radicals L are linked to one another via a bridge Z, where Z is  $\text{CR}^2\text{R}^3$  or  $\text{SiR}^2\text{R}^3$ .

$\text{R}^2$  and  $\text{R}^3$  are identical or different and are each a hydrogen atom, a halogen atom, a  $\text{C}_1-\text{C}_{20}$ -alkyl group, a  $\text{C}_1-\text{C}_{10}$ -fluoralkyl group, a  $\text{C}_1-\text{C}_{10}$ -alkoxy group, a  $\text{C}_6-\text{C}_{14}$ -aryl group, a  $\text{C}_6-\text{C}_{10}$ -fluoroaryl group, a  $\text{C}_6-\text{C}_{10}$ -aryloxy group, a  $\text{C}_2-\text{C}_{10}$ -alkenyl group, a  $\text{C}_7-\text{C}_{40}$ -arylalkyl group, a  $\text{C}_7-\text{C}_{40}$ -

alkylaryl group, a C<sub>8</sub>-C<sub>40</sub>-arylalkenyl group, or R<sup>2</sup> and R<sup>3</sup> together with the atoms connected them form one or more rings, and R<sup>2</sup> and R<sup>3</sup> are optionally bonded to L.

X and X' together form an unsaturated four-membered hydrocarbon chain whose hydrogen atoms are optionally replaced by C<sub>1</sub>-C<sub>20</sub>-alkyl groups.

35. A transition metal compound of the formula IV



wherein

L are different if n is 2, 3 or 4, and are each a  $\pi$  ligand or electron donor,

n is equal to 1, 2, 3, or 4,

M is a metal atom of group IIIb, IVb, Vb or VIb of the Periodic Table of the Elements,

X is a heteroatom or a hydrocarbon group having 1-40 carbon atoms,

X' is a hydrocarbon group having 1-40 carbon atoms.

36. The transition metal compound as claimed in claim 35, wherein the radicals L are different and are each an unsubstituted or substituted cyclopentadienyl group.

37. The transition metal compound as claimed in claim 35, wherein the radicals L are linked to one another via a bridge.
38. The transition metal compound as claimed in claim 35, wherein n is 2 when M is a metal atom of group IVb of the Periodic Table of the Elements.
39. The transition metal compound as claimed in claim 35, wherein  
M is a metal atom of group IVb of the Periodic Table of the Elements, n is equal to 2,  
L are different and are each a substituted or unsubstituted cyclopentadienyl group, where two  
radicals L are optionally linked to one another via a bridge Z and  
Z is CR<sup>2</sup>R<sup>3</sup> or SiR<sup>2</sup>R<sup>3</sup> or a unit Si-(CR<sup>2</sup>R<sup>3</sup>)<sub>x</sub>-Si which links two fragments L<sub>n</sub>M'XX'A-R<sup>1</sup><sub>m</sub> with  
one another, where x is an integer from 0 to 10,  
X and X' together form a three-membered to five-membered hydrocarbon chain which can  
be saturated or unsaturated and are unsubstituted or substituted by one or more C<sub>1</sub>-C<sub>20</sub>=  
hydrocarbon radicals,  
R<sup>2</sup> and R<sup>3</sup> are identical or different and are each a hydrogen atom, a halogen atom, a C<sub>1</sub>-  
C<sub>20</sub>-alkyl group, a C<sub>1</sub>-C<sub>10</sub>-fluoralkyl group, a C<sub>1</sub>-C<sub>10</sub>-alkoxy group, a C<sub>6</sub>-C<sub>14</sub>-aryl group, a  
C<sub>6</sub>-C<sub>10</sub>-fluoroaryl group, a C<sub>6</sub>-C<sub>10</sub>-aryloxy group, a C<sub>2</sub>-C<sub>10</sub>-alkenyl group, a C<sub>7</sub>-C<sub>40</sub>-arylalkyl  
group, a C<sub>7</sub>-C<sub>40</sub>-alkylaryl group, a C<sub>8</sub>-C<sub>40</sub>-arylalkenyl group, or R<sup>2</sup> and R<sup>3</sup> together with  
the atoms connected them form one or more rings, and R<sup>2</sup> and R<sup>3</sup> are optionally bonded  
to L.



40. The transition metal compound as claimed in claim 35, wherein

M is zirconium,

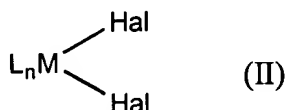
n is 2,

L are different and are each a substituted cyclopentadienyl group, where two radicals L are linked to one another via a bridge Z, where Z is CR<sup>2</sup>R<sup>3</sup> or SiR<sup>2</sup>R<sup>3</sup> and

R<sup>2</sup> and R<sup>3</sup> are identical or different and are each a hydrogen atom, a halogen atom, a C<sub>1</sub>-C<sub>20</sub>-alkyl group, a C<sub>1</sub>-C<sub>10</sub>-fluoralkyl group, a C<sub>1</sub>-C<sub>10</sub>-alkoxy group, a C<sub>6</sub>-C<sub>14</sub>-aryl group, a C<sub>6</sub>-C<sub>10</sub>-fluoroaryl group, a C<sub>6</sub>-C<sub>10</sub>-aryloxy group, a C<sub>2</sub>-C<sub>10</sub>-alkenyl group, a C<sub>7</sub>-C<sub>40</sub>-arylalkyl group, a C<sub>7</sub>-C<sub>40</sub>-alkylaryl group, a C<sub>8</sub>-C<sub>40</sub>-arylalkenyl group, or R<sup>2</sup> and R<sup>3</sup> together with the atoms connected them form one or more rings, and R<sup>2</sup> and R<sup>3</sup> are optionally bonded to L.

X and X' together form an unsaturated four-membered hydrocarbon chain whose hydrogen atoms are optionally replaced by C<sub>1</sub>-C<sub>20</sub>-alkyl groups.

41. A process for preparing the compound as claimed in claim 35,  
which comprises reacting a compound of the formula II



with a compound of the formula III

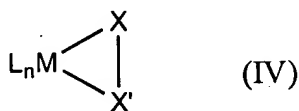


and reacting the reaction product with a compound of the formula  $AR^1_m$ , where L, n, M, X and

X' in the formulae II and III are defined for the formula IV,

Hal is a halogen atom.

42. A transition metal compound of the formula IV



wherein

L are identical or different and are each a  $\pi$  ligand or electron donor,

n is equal to 1, 2, 3, or 4,

M is a metal atom of group IIIb, IVb, Vb or VIb of the Periodic Table of the Elements,

X is a heteroatom, a  $C_6-C_{14}$ -aryl group, a  $C_7-C_{40}$ -arylalkyl group, a  $C_7-C_{40}$ -alkylaryl group or a  $C_8-C_{40}$ -arylalkenyl group,

X' or a hydrocarbon group having 1-40 carbon atoms.

43. The transition metal compound as claimed in claim 42, wherein the radicals L are different and are each an unsubstituted or substituted cyclopentadienyl group.
44. The transition metal compound as claimed in claim 42, wherein the radicals L are linked to one another via a bridge.
45. The transition metal compound as claimed in claim 42, wherein n is 2 when M is a metal atom of group IVb of the Periodic Table of the Elements.
46. The transition metal compound as claimed in claim 42, wherein  
M is a metal atom of group IVb of the Periodic Table of the Elements, n is equal to 2,  
L are different and are each a substituted or unsubstituted cyclopentadienyl group, where two  
radicals L are optionally linked to one another via a bridge Z and  
Z is CR<sup>2</sup>R<sup>3</sup> or SiR<sup>2</sup>R<sup>3</sup> or a unit Si-(CR<sup>2</sup>R<sup>3</sup>)<sub>x</sub>-Si which links two fragments L<sub>n</sub>M'XX'A-R'<sub>m</sub> with  
one another, where x is an integer from 0 to 10,  
X and X' together form a three-membered or five-membered hydrocarbon chain which can  
be saturated or unsaturated and are unsubstituted or substituted by one or more C<sub>1</sub>-C<sub>20</sub>-  
hydrocarbon radicals,  
R<sup>2</sup> and R<sup>3</sup> are identical or different and are each a hydrogen atom, a halogen atom, a C<sub>1</sub>-  
C<sub>20</sub>-alkyl group, a C<sub>1</sub>-C<sub>10</sub>-fluoralkyl group, a C<sub>1</sub>-C<sub>10</sub>-alkoxy group, a C<sub>6</sub>-C<sub>14</sub>-aryl group, a  
C<sub>6</sub>-C<sub>10</sub>-fluoroaryl group, a C<sub>6</sub>-C<sub>10</sub>-aryloxy group, a C<sub>2</sub>-C<sub>10</sub>-alkenyl group, a C<sub>7</sub>-C<sub>40</sub>-arylalkyl

group, a C<sub>7</sub>-C<sub>40</sub>-alkylaryl group, a C<sub>8</sub>-C<sub>40</sub>-arylalkenyl group, or R<sup>2</sup> and R<sup>3</sup> together with the atoms connected them form one or more rings, and R<sup>2</sup> and R<sup>3</sup> are optionally bonded to L.

47. The transition metal compound as claimed in claim 42, wherein

M is zirconium,

n is 2,

L are different and are each a substituted cyclopentadienyl group, where two radicals L are linked to one another via a bridge Z, where Z is CR<sup>2</sup>R<sup>3</sup> or SiR<sup>2</sup>R<sup>3</sup> and

R<sup>2</sup> and R<sup>3</sup> are identical or different and are each a hydrogen atom, a halogen atom, a C<sub>1</sub>-C<sub>20</sub>-alkyl group, a C<sub>1</sub>-C<sub>10</sub>-fluoralkyl group, a C<sub>1</sub>-C<sub>10</sub>-alkoxy group, a C<sub>6</sub>-C<sub>14</sub>-aryl group, a C<sub>6</sub>-C<sub>10</sub>-fluoroaryl group, a C<sub>6</sub>-C<sub>10</sub>-aryloxy group, a C<sub>2</sub>-C<sub>10</sub>-alkenyl group, a C<sub>7</sub>-C<sub>40</sub>-arylalkyl group, a C<sub>7</sub>-C<sub>40</sub>-alkylaryl group, a C<sub>8</sub>-C<sub>40</sub>-arylalkenyl group, or R<sup>2</sup> and R<sup>3</sup> together with the atoms connected them form one or more rings, and R<sup>2</sup> and R<sup>3</sup> are optionally bonded to L.

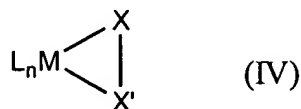
48. A compound selected from the group consisting of

Bis (methylcyclopentadienyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Bis (n-butyl-cyclopentadienyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Bisindenyl ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
(tert. butylamido) dimethyl (tetramethyl- $\eta^5$ -cyclopentadienyl) si-  
lan-Zr<sup>+</sup>CH<sub>2</sub>CHCHCH<sub>2</sub>;  
Bis (2-methylbenzoindenyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Dimethylsilandiylbis (2-methyl-indenyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Dimethylsilandiylbisindenyl Zr<sup>+</sup>CH<sub>2</sub>CHCHCH<sub>2</sub>;  
Dimethylsilandiylbis (2-methylbenzoindenyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Dimethylsilandiyl (2-methylbenzoindenyl) (2-methyl-indenyl)  
ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Dimethylsilandiyl (2-methylbenzoindenyl) (2-methyl-4-phenylindenyl)  
ZrCH<sub>2</sub>CHCHCH<sub>2</sub> ;  
Dimethylsilandiyl (2-methylindenyl) (4-phenylindenyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Dimethylsilandiylbis (2-methyl-4-phenyl-indenyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Dimethylsilandiylbis (2-methyl-4, 6-diisopropyl-indenyl) Zr<sup>+</sup>  
CH<sub>2</sub>CHCHCH<sub>2</sub>;  
Dimethylsilaniylbis (2-methyl-4-naphtyl-indenyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Isopropyliden (cyclopentadienyl) (fluorenyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Isopropyliden (cyclopentadienyl) (indenyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
[4- ( $\eta^5$ -Cyclopentadienyl) -4, 7, 7-trimethyl- ( $\eta^5$ -4.5.6.7-tetrahydro-  
indenyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Dimethylsilandiylbis (2-methyl-indenyl) ZrOCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>;  
Dimethylsilandiylbisindenyl ZrOCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>;  
Dimethylsilandiylbis (2-methylbenzoindenyl) ZrOCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>;  
Dimethylsilandiyl (2-methylbenzoindenyl) (2-methyl-indenyl)  
ZrOCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>;  
Dimethylsilandiyl (2-methylbenzoindenyl) (2-methyl-4-phenylindenyl)  
ZrOCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>;  
Dimethylsilandiyl (2-methylindenyl) (4-phenylindenyl) ZrOCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>;  
Dimethylsilandiylbis (2-methyl-4-phenyl-indenyl) ZrOCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>;  
Dimethylsilandiylbis (2-methyl-4, 6-diisopropyl-indenyl)  
ZrOCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>;  
Dimethylsilandiylbis (2-methyl-indenyl) ZrCH<sub>2</sub>C (CH<sub>3</sub>) C (CH<sub>3</sub>) CH<sub>2</sub>;  
Dimethylsilandiylbisindenyl ZrCH<sub>2</sub>C (CH<sub>3</sub>) C (CH<sub>3</sub>) CH<sub>2</sub>;  
Dimethylsilandiylbis (2-methylbenzoindenyl) Zr<sup>+</sup>CH<sub>2</sub>C (CH<sub>3</sub>) C (CH<sub>3</sub>) CH<sub>2</sub>;  
Dimethylsilandiyl (2-methylbenzoindenyl) (2-methyl-indenyl)  
ZrCH<sub>2</sub>C (CH<sub>3</sub>) C (CH<sub>3</sub>) CH<sub>2</sub>;  
Dimethylsilandiyl (2-methylbenzoindenyl) (2-methyl-4-phenylindenyl)  
ZrCH<sub>2</sub>C (CH<sub>3</sub>) C (CH<sub>3</sub>) CH<sub>2</sub>;

Dimethylsilandiyl(2-methylindenyl)(4-phenylindenyl)  
ZrCH<sub>2</sub>C(CH<sub>3</sub>)C(CH<sub>3</sub>)CH<sub>2</sub>;  
Dimethylsilandiylbis(2-methyl-4-phenyl-indenyl)  
ZrCH<sub>2</sub>C(CH<sub>3</sub>)C(CH<sub>3</sub>)CH<sub>2</sub>;  
Dimethylsilandiylbis(2-methyl-4,6-diisopropyl-indenyl)  
ZrCH<sub>2</sub>C(CH<sub>3</sub>)C(CH<sub>3</sub>)CH<sub>2</sub>;  
Dimethylsilaniylbis(2-methyl-4-naphtyl-indenyl)  
ZrCH<sub>2</sub>C(CH<sub>3</sub>)C(CH<sub>3</sub>)CH<sub>2</sub>;  
Methylphenylmethylen-(fluorenyl)(cyclopentadienyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Diphenylmethylen-(fluorenyl)(cyclopentadienyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Isopropyliden-(3-methylcyclopentadienyl)(fluorenyl)  
ZrCH<sub>2</sub>CHCHCH<sub>2</sub>B<sup>-</sup>(C<sub>6</sub>F<sub>5</sub>)<sub>3</sub>;  
Dimethylsilandiyl-(3-tert.-Butylcyclopentadienyl)(fluorenyl)  
ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Diphenylsilandiyl-(3-(trimethylsilyl)cyclopentadienyl)(fluorenyl)  
ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Phenylmethylsilandiylbis(e-methyl-indenyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
PhenylmethylsilandiylbisindenylZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Phenylmethylsilandiylbis(2-methyl-4,5-benzoindenyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Phenylmethylsilandiylbis(2-methyl-4,5-benzoindenyl)(2-methyl  
-indenyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Phenylmethylsilandiyl(2-methyl-4,5-benzoindenyl)(2-methyl-4  
-phenylindenyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Phenylmethylsilaniyl(2-methylindenyl)(4-phenylindenyl)  
ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Phenylmethylsilandiylbis(2-methyl-4-phenyl-indenyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Phenylmethylsilandiylbis(2-ethyl-4-phenyl-indenyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Phenylmethylsilandiylbis(2-methyl-4,6-diisopropyl-indenyl)  
ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Phenylmethylsilandiylbis(2-methyl-4-naphtyl-indenyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Ethylenbis(2-methyl-indenyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
EthylenbisindenylZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Ethylenbis(2-methyl-4,5-benzoindenyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Ethylen(2-methyl-4,5-benzoindenyl)(2-methyl-indenyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Ethylen(2-methyl-4,5-benzoindenyl)(2-methyl-4-phenylindenyl)  
ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Ethylen(2-methylindenyl)(4-phenylindenyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Ethylenbis(2-methyl-4,5-benzoindenyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Ethylenbis(2-methyl-4-phenyl-indenyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Ethylenbis(2-methyl-4,6-diisopropyl-indenyl)ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;

Ethylenbis (2-methyl-4-naphtyl-indenyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Ethylenbis (2-ethyl-4-phenyl-indenyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Ethylenbis (2-ethyl-4,6-diisopropyl-indenyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Ethylenbis (2-ethyl-4-naphtyl-indenyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Dimethylsilandiylbis (2-ethyl-4-phenyl-indenyl) ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
Dimethylsilandiylbis (2,3,5-trimethylcyclopentadienyl)  
ZrCH<sub>2</sub>CHCHCH<sub>2</sub>;  
1,6-{Bis [methylsilyl-bis (2-methyl-4-phenyl-indenyl) Zr+CH<sub>2</sub>CHCHCH<sub>2</sub>  
B<sup>-</sup> (C<sub>6</sub>F<sub>5</sub>)<sub>3</sub>] } hexan;  
1,6-{Bis [methylsilyl-bis (2-ethyl-4-phenyl-indenyl)  
Zr+CH<sub>2</sub>CHCHCH<sub>2</sub>B<sup>-</sup> (C<sub>6</sub>F<sub>5</sub>)<sub>3</sub>] } hexan;  
1,6-{Bis [methylsilyl-bis (2-methyl-4-naphtyl-indenyl) Zr+CH<sub>2</sub>CHCHCH<sub>2</sub>  
B<sup>-</sup> (C<sub>6</sub>F<sub>5</sub>)<sub>3</sub>] } hexan;  
1,6-{Bis [methylsilyl-bis (2-methyl-4,5-benzoindenyl) Zr<sup>+</sup>CH<sub>2</sub>CHCHCH<sub>2</sub>  
B<sup>-</sup> (C<sub>6</sub>F<sub>5</sub>)<sub>3</sub>] } hexan;  
1,6-{Bis [methylsilyl- (2-methyl-4-phenyl-indenyl) (2-methyl-inde-  
nyl) Zr<sup>+</sup>CH<sub>2</sub>CHCHCH<sub>2</sub>B<sup>-</sup> (C<sub>6</sub>F<sub>5</sub>)<sub>3</sub>] } hexan;  
1,2-{Bis [methylsilyl-bis (2-methyl-4-phenyl-indenyl) Zr<sup>+</sup>CH<sub>2</sub>CHCHCH<sub>2</sub>  
B<sup>-</sup> (C<sub>6</sub>F<sub>5</sub>)<sub>3</sub>] } ethan;  
1,2-{Bis [methylsilyl-bis (2-ethyl-4-phenyl-indenyl) Zr<sup>+</sup>CH<sub>2</sub>CHCHCH<sub>2</sub>  
B<sup>-</sup> (C<sub>6</sub>F<sub>5</sub>)<sub>3</sub>] } ethan;  
1,2-{Bis [methylsilyl-bis (2-methyl-4-naphtyl-indenyl) Zr<sup>+</sup>CH<sub>2</sub>CHCHCH<sub>2</sub>  
B<sup>-</sup> (C<sub>6</sub>F<sub>5</sub>)<sub>3</sub>] } ethan;  
1,2-{Bis [methylsilyl-bis (2-methyl-4,5-benzoindenyl) Zr<sup>+</sup>CH<sub>2</sub>CHCHCH<sub>2</sub>  
B<sup>-</sup> (C<sub>6</sub>F<sub>5</sub>)<sub>3</sub>] } ethan; and  
1,2-{Bis [methylsilyl- (2-methyl-4-phenyl-indenyl) (2-methyl-inde-  
nyl) Zr<sup>+</sup>CH<sub>2</sub>CHCHCH<sub>2</sub>B<sup>-</sup> (C<sub>6</sub>F<sub>5</sub>)<sub>3</sub>] } ethan.

49. A transition metal compound of the formula IV



wherein

L are identical or different and are each a  $\pi$  ligand or electron donor,

n is equal to 1, 2, 3, or 4,

M is a metal atom of group IIIb, IVb, Vb or VIb of the Periodic Table of the Elements,

X is a heteroatom or a hydrocarbon group having 1-40 carbon atoms,

X' is a hydrocarbon group having 1-40 carbon atoms,

with the proviso that at least on L is a substituted or unsubstituted indenyl.

50. The transition metal compound as claimed in claim 49, wherein the radicals L are linked to one another via a bridge.

51. The transition metal compound as claimed in claim 49, wherein n is 2 when M is a metal atom of group IVb of the Periodic Table of the Elements.

52. The transition metal compound as claimed in claim 49, wherein

M is a metal atom of group IVb of the Periodic Table of the Elements, n is equal to 2,  
where two radicals L are optionally linked to one another via a bridge Z and



Z is  $\text{CR}^2\text{R}^3$  or  $\text{SiR}^2\text{R}^3$  or a unit  $\text{Si}-(\text{CR}^2\text{R}^3)_x-\text{Si}$  which links two fragments  $\text{L}_n\text{M}'\text{XX}'\text{A}-\text{R}^1_m$  with one another, where x is an integer from 0 to 10,

$\text{R}^2$  and  $\text{R}^3$  are identical or different and are each a hydrogen atom, a halogen atom, a  $\text{C}_1\text{-C}_{20}$ -alkyl group, a  $\text{C}_1\text{-C}_{10}$ -fluoralkyl group, a  $\text{C}_1\text{-C}_{10}$ -alkoxy group, a  $\text{C}_6\text{-C}_{14}$ -aryl group, a  $\text{C}_6\text{-C}_{10}$ -fluoroaryl group, a  $\text{C}_6\text{-C}_{10}$ -aryloxy group, a  $\text{C}_2\text{-C}_{10}$ -alkenyl group, a  $\text{C}_7\text{-C}_{40}$ -arylalkyl group, a  $\text{C}_7\text{-C}_{40}$ -alkylaryl group, a  $\text{C}_8\text{-C}_{40}$ -arylalkenyl group, or  $\text{R}^2$  and  $\text{R}^3$  together with the atoms connected them form one or more rings, and  $\text{R}^2$  and  $\text{R}^3$  are optionally bonded to L.

53. The transition metal compound as claimed in claim 49, wherein

M is zirconium,

n is 2,

where two radicals L are linked to one another via a bridge Z, wherein

Z is  $\text{CR}^2\text{R}^3$  or  $\text{SiR}^2\text{R}^3$  and

$\text{R}^2$  and  $\text{R}^3$  are identical or different and are each a hydrogen atom, a halogen atom, a  $\text{C}_1\text{-C}_{20}$ -alkyl group, a  $\text{C}_1\text{-C}_{10}$ -fluoralkyl group, a  $\text{C}_1\text{-C}_{10}$ -alkoxy group, a  $\text{C}_6\text{-C}_{14}$ -aryl group, a  $\text{C}_6\text{-C}_{10}$ -fluoroaryl group, a  $\text{C}_6\text{-C}_{10}$ -aryloxy group, a  $\text{C}_2\text{-C}_{10}$ -alkenyl group, a  $\text{C}_7\text{-C}_{40}$ -arylalkyl group, a  $\text{C}_7\text{-C}_{40}$ -alkylaryl group, a  $\text{C}_8\text{-C}_{40}$ -arylalkenyl group, or  $\text{R}^2$  and  $\text{R}^3$  together with the atoms connected them form one or more rings, and  $\text{R}^2$  and  $\text{R}^3$  are optionally bonded to L. - -